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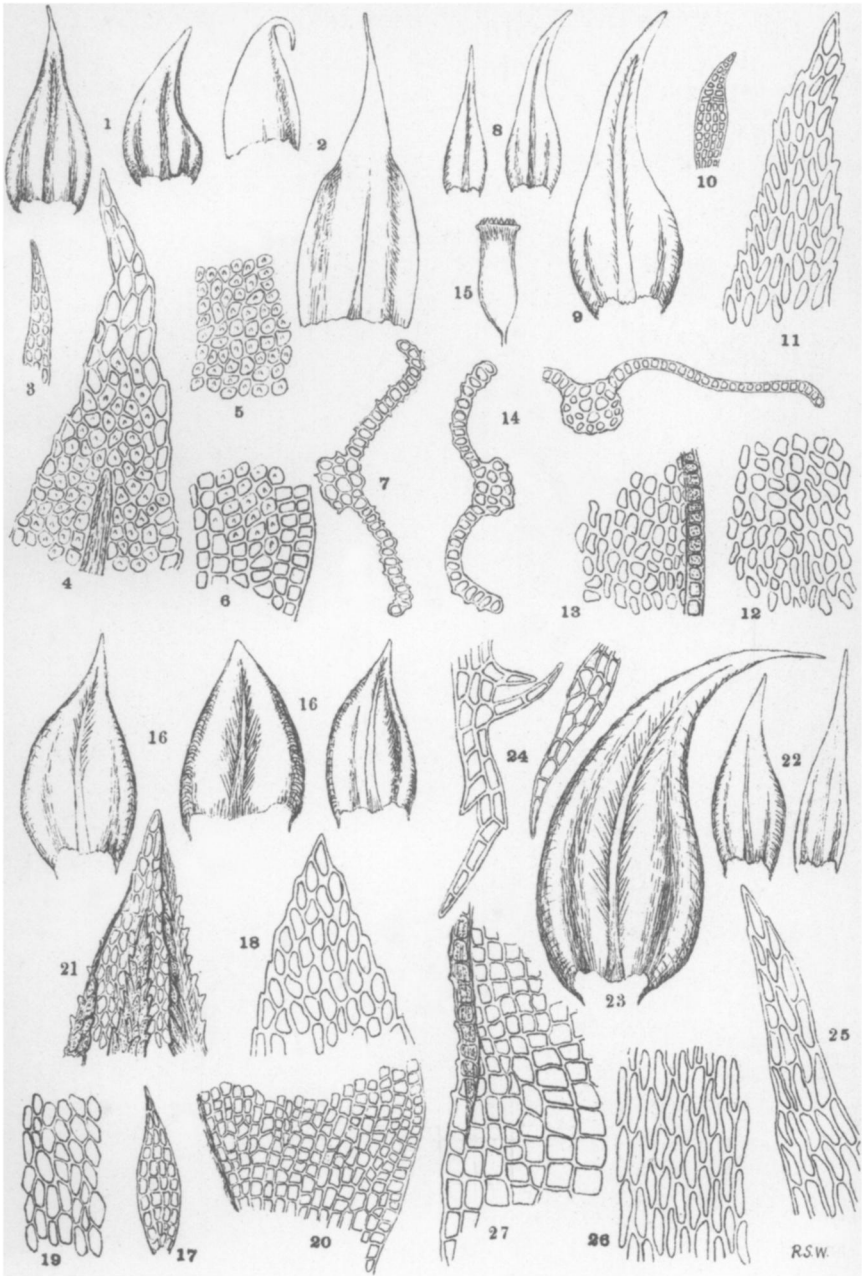
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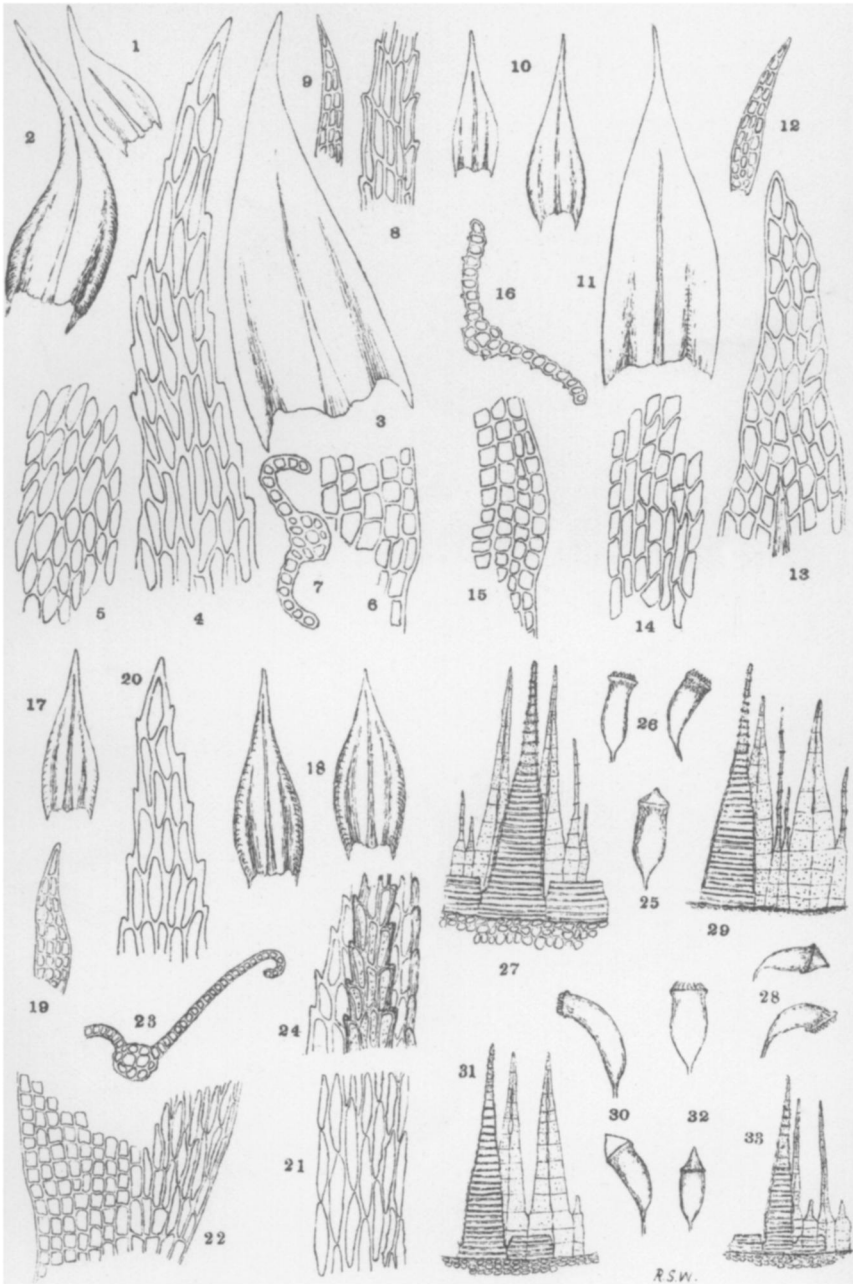
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BULLETIN
OF THE
TORREY BOTANICAL CLUB

MAY 1900

Revision of the North American Species of *Pseudoleskea**

BY G. N. BEST

(PLATES 7 AND 8)

While it is true that some mosses are so fully differentiated as to fall readily in well-defined species there are others, probably a larger number, that do not behave in this way but appear in groups or series of closely intergrading forms. A satisfactory arrangement of these tries the skill of the systematist to the utmost. If such a group or series be taken as one species a description broad enough to cover the varying forms is generally too indefinite for practical purposes ; if species be made of each of the extremes the intermediate forms are but poorly described, and if each of these forms be allowed specific rank nomenclature becomes burdensome to say the least. In general terms and within certain limits it may be stated that the more species made of such a series or group the more unstable are the characters by which they are separated, or supposed to be separated, and the more difficult it becomes to place a given plant. By a careful study however of considerable material it is usually possible to acquire a conception of a central type, which is of value in that it enables the systematist to fix a starting point from which he may gauge the variations.

What constitutes a species is indeed a vexed question, one not likely to be answered soon to the satisfaction of all. It may be safely said however, that a species should represent a fixed point in the evolution of a plant. In other words that it should mean

*The material on which this revision is based was furnished chiefly by Columbia University, the Geological Survey of Canada and Harvard University.

something, should possess an element of constancy and should not be founded on such variations as originate in the changing conditions by which all plants are more or less influenced. The fashionable tendency to multiply species on the pretext that this is the panacea for all systematic troubles, is not always the outcome of a fuller knowledge on the part of those who make them but often is due either to ignorance of what others have done along the same lines or a desire to appear to know more than their confrères. In the making of species, as with many other things, the better course lies between the extremes and, no matter how often we divide and subdivide our plants, it is quite possible to continue the process along the same lines and for the same reasons until each individual has a specific name of its own.

The members of the genus *Pseudoleskea* are mountain-loving plants which flourish best at high altitudes. When they appear at lower levels they not infrequently show their inability to adapt themselves to their environment by taking on atavistic or depauperate forms. But sparingly collected and then usually without fruit their consideration from a systematic standpoint is somewhat difficult. By an attentive study, however, of considerable material, American and European, it has been possible to acquire a fair conception of the central types that underlie them and to arrange them in accordance with more modern views of nomenclature.

Undesirable as it is in some respects, it becomes necessary to reduce *Lescuraea* to the rank of a subgenus. American plants efface the lines of separation between it and *Pseudoleskea*. The gametophyte characters of *P. radicata* and *P. rigescens* connect so closely with those of the European *Lescuraea*s as to leave no doubt of their being congeneric. On the other hand the sporophyte characters of *P. radicata* closely connect with those of *P. atrovirens* while those of *P. rigescens* do the same with the sporophyte characters of *Lescuraea striata*. Indeed, so closely related are these last that Schimper* refers to *P. rigescens* under *Lescuraea* as a "*species Americanae distinctissima*." Sullivan,† however, held that *P. rigescens* (*Leskea rigescens* Wils.) was simply a

* Syn. Musc. Eur. 2 : 621. 1876.

† Ms. Notes on *Pseudoleskea* in Gray herb.

variety, var. *gracilior*, of *P. radicata* and that this species, "a good *Pseudoleskea*," connected *Pseudoleskea* with *Lescuraea*. As recognized in this Revision the *Pseudoleskeas* constitute an unbroken series more closely related, as they should be, by their sporophyte characters than by their gametophyte.

In this connection it is impossible to make mention of the many favors of which I have been the recipient while engaged in the preparation of this monograph. My grateful acknowledgments however are due Mrs. Britton for invaluable assistance and unnumbered kindnesses and Mr. R. S. Williams for the care with which he has executed the drawings. For valued contributions, types, specimens, notes, my sincere thanks are due Prof. John Macoun, Mr. H. N. Dixon, Mr. Jules Cardot, Dr. B. L. Robinson, Dr. M. A. Howe, M. Eugene Autran, Mr. A. Gepp, Mr. J. B. Leiberger, Rev. A. C. Waghorne, Prof. J. M. Holzinger, Mr. R. S. Williams and Mr. C. E. Faxon.

PSEUDOLESKEA Bryol. Eur. 5: 1852. In part

Plants small to medium size growing on rocks, stones, bases of trees, rarely on rotten wood or the ground, in mountainous regions. Stems radiculose, pinnately branched, central strand none or rudimentary; branches simple, usually recurved at tips; paraphyllia numerous, mostly linear-lanceolate; leaves papillose or smooth, entire or serrulate above, biplicate, ovate-lanceolate, acuminate, costate, margins more or less recurved; leaf cells quadrate-hexagonal to linear-rhomboidal; capsules erect or inclined, straight or curved, pachydermatic, air spaces none, stomata few at base and functionless; exostome well developed, teeth confluent at base into a colored basal band of the same texture; endostomal band $\frac{1}{3}$ to $\frac{1}{6}$ the length of the teeth; segments as long as the teeth; cilia poorly developed; calyptra cucullate.

Braithwaite* and some others reduce *Pseudoleskea* to a subgenus under *Leskea*. This reduction is probably based on insufficient data. The species of *Pseudoleskea* are usually stouter plants, the leaves more strongly recurved on their margins and the areolation longer and narrower. The peristomes moreover show a higher grade of development, the exostomes have a distinct basal band and the exothecial cells are quadrate and thick-walled.

* Brit. Moss. Flora, 3: 9. 1896.

Key to Species

Median cells of stem leaves usually not more than twice as long as wide.

Leaves papillate on both surfaces. 1. *atrovirens*.

Leaves smooth or papillate on upper surface.

Leaves long-acuminate. 2. *oligoclada*.

Leaves acute to short-acuminate. 3. *pallida*.

Median cells of stem leaves usually more than twice as long as wide.

Stems long, branches few, without radicles. 4. *denudata*.

Stems short, radiculose, freely branching.

Capsule curved when dry, segments oblong-lanceolate. 5. *radicosa*.

Capsule straight when dry, segments narrowly linear.

Basal cells oblong-quadrate in several rows 6. *rigescens*.

Basal cells oblong-linear in two or three rows. 7. *substriata*.

§ EU-PSEUDOLESKEA: Plants rigid, papillose or smooth, median leaf cells not more than twice as long as wide, capsule asymmetric, endostomial band about $\frac{1}{3}$ the length of the teeth.

I. PSEUDOLESKEA ATROVIRENS (Dicks.) Bryol. Eur. 5: 2. pl. 477.
1852

Hypnum atrovirens Dickson fasc. 2. 10. 1790.

Leskea (?) *patens* Lindb. Soc. pro Fauna at Flora Fenn. 1880.

Pseudoleskea ticinensis Bott. Soc. Tosc. Sc. Nat. 1891.

Pseudoleskea atrovirens, var. *patens* (Lindb.) Hagen in Sched.
1894.

Pseudoleskea heterocladioides Kindb. Rev. Bryol. 22: 83. 1895.

Pseudoleskea tenella Kindb. Eur. & N. Am. Bry. 50. 1896.

In loosely spreading tufts, dark green above, reddish brown below. Stems 3–5 cm. long, prostrate or prostrate-ascending, radiculose, simple or divided, sparingly branched below, irregularly pinnately above: branches simple, unequal, straight or curved, paraphyllia linear-lanceolate: stem leaves asymmetric, appressed-incurved when dry, erect-spreading on all sides when moist, the lower sometimes spreading-recurved, entire or serrate above; from an ovate or ovate-oblong subdecurrent base gradually acute to somewhat abruptly acuminate, sharply and obliquely pointed, straight or subsecund, margins recurved below, not rarely also at the base of the acumen, lightly biplicate, costate to $\frac{3}{4}$, .8–1.2 mm. long, .4–.55 mm. wide: cells of stem leaves nearly isodiametric, incrassate, chlorophyllose, unipapillate on both surfaces, papillae central, conic on upper surface, round and flat on lower: median cells quadrate-hexagonal, rarely suborbicular or oblong-hexagonal, .007–.009 mm. wide; also the basal quadrate, in several rows; apical oval-oblong. Dioicous: inner perichetial

bracts whitish, loosely erect, narrowly acuminate, lightly costate: pedicels smooth, reddish brown, somewhat curved, 8–10 mm. long: capsule inclined to horizontal, broadly oval, asymmetric: exothecial cells thick-walled, roundish quadrate: urn 1.5 mm. long, 8 mm. wide, constricted when empty: annulus narrow: exostomial teeth yellowish brown, margined, confluent into a purplish red basal band 5 joints wide: lamellae numerous, well developed: endostomial band yellowish, papillate, $\frac{1}{4}$ – $\frac{1}{3}$ the length of the teeth; segments as long as the teeth, not rarely slightly open on the keel: cilia one or two, poorly developed: spores rough, .012–.016 mm.; ripe in spring.

Type locality unknown, probably Scotland.

On rocks, rarely on the bases of trees or the ground. From Labrador and Newfoundland (Waghorne) to British Columbia, (Macoun) southward. Mt. Washington, N. H. (C. E. Faxon), Idaho (Lieberg, Sandberg), Montana (Williams), Washington (Röll, Suksdorf), California (Bolander), Greenland?

EXSIC.: Ren. & Card. Musc. Amer. Sept. 92; Husnot Musc. Gal. 343.

Like all wide-spread species *P. atrovirens* presents a number of forms, none however sufficiently distinct to be regarded as good varieties. Depauperate and diseased plants, in which the normal characters are more or less obscured, are easily referred to the type. One of these, *P. tenella* Kindb., collected on the Labrador, appears at first sight distinct in its nearly branchless stems and smaller leaves, but the leaf-cells and capsules suffice to locate it. On the other hand, stouter plants from the Northwest, with leaves more nearly symmetric, capsules slightly larger, cilia better developed and opercula often short beaked, represent the highest development of the species.

An examination of European material revealed the fact that at least two distinct species were passing as *P. atrovirens*. In order to ascertain which of these had priority, specimens were submitted to Mr. Gepp with a request that they be compared with the type in herb. Dickson in the British Museum. In reply he said, "I am able to tell you that Dickson's type agrees macroscopically and microscopically with No. 1, the leaf-cells in each are quadrate-hexagonal to oval hexagonal, nearly isodiametric, chlorophyllose and stoutly papillose." No. 1, to which Mr. Gepp

refers, was collected by Greville on Ben Lawers. There is therefore no doubt as regards the identity of this species as the leaf-cells are distinctive.

Under *Pseudoleskea*, Limpricht* recognizes but two species, *P. patens* (Lindb.) and *P. atrovirens* (Dicks.), the last with var. *brachyclados* and var. *tenella*. While it is plain that *P. patens* is the same as Dickson's plant, it is not so plain as to what is to be understood by his *P. atrovirens*. Nor do the exsiccatae which he cites help matters much. As these appear in the herb. Jaeger, they but loosely fit the description he gives. In point of fact the exsiccatae belong to a species already referred to as passing for *P. atrovirens* and whose proper name must be ferreted out of the synonyms of this species. It is closely related to *P. oligoclada* Kindb. and is probably *Leskea incurvata* Hedw.

Leskea brachyclados Schwaegr.† usually considered a variety of *P. atrovirens*, has given rise to its share of confusion. Limpricht states that "diese varietat von den Autoren sehr verschieden gedeutet," as it certainly is if reliance can be placed on the type kindly loaned Mrs. Britton by M. Autran from herb. Boissier. This plainly shows that *Leskea brachyclados* is more closely related to *P. radicata* (Mitt.) than to Dickson's plant, in fact it is scarcely distinct from it. Limpricht's var. *brachyclados* is probably a good species.

2. PSEUDOLESKEA OLIGOCLADA Kindberg, Bull. Torr. Club,
17 : 277. 1890. [Pl. 6]

In rigid spreading tufts, yellow-green to reddish brown, usually with a subvitreous lustre. Stems 3–6 cm. long, prostrate-ascending, sparingly branched, curved at the tips : branches unequal, sub-julaceous, recurved : paraphyllia numerous : stem leaves close, 6–8-ranked, appressed when dry, erect spreading when moist, falcate-secund, biplicate, margins more or less recurved ; from an oblong-ovate subdecurrent base, somewhat gradually narrowed into a long, serrate or entire acumen, 1.2–1.5 mm. long, .45–.6 mm. wide : costa stout, round, toothed on lower surface, disappearing in the acumen : cells of stem leaves not uniform, rather small and compact, with rounded-obtuse ends ; primordial utricle usually distinct ; median cells smooth on lower surface, lightly unipapil-

* Die Laubmoose, 2 : 805. 1896.

† Schulte. Reise auf den Glockner, 2 : 364. 1804.

late on upper, not rarely smooth on both, oval-rhombic to linear-oblong, .006-.008 mm. wide, 2 to 3 times as long: basal cells quadrate-oblong to sublinear; alar transversely oval, becoming roundish quadrate and extending well up the margins; apical small, oval to oval-oblong: branch leaves falcate, more distinctly serrulate, scarcely plicate. Dioicous: perichetial bracts erect, whitish, long and narrowly subfiliform acuminate, distantly toothed or entire, lightly costate: cells long linear, subvermicular: pedicels 9-11 mm. long, more or less curved: capsule oval-oblong, subsymmetric, cernuous, reddish brown: exothecial cells roundish oblong-quadrate; exostomial teeth reddish brown, confluent at base into a reddish band 5 joints wide: lamellae numerous, stout: endostomial band yellowish, scarcely papillose, about $\frac{1}{3}$ the length of the teeth; segments as long but narrower than the teeth, open on the keel: cilia one to two, more or less developed; annulus narrow, indistinct: operculum conic: spores rough, .014-.016 mm.; matures in spring.

Type locality Vancouver Island; duplicate of type in Coll. Can. Geol. Surv.; collected by Prof. John Macoun, June 8, 1887.

On rocks and stones apparently at high altitudes. British Columbia (Macoun), Washington (Röll), Montana (Williams), Idaho (Leiberg), Colorado (Brandegee).

EXSIC.: Macoun, Can. Musc. 610.

P. oligoclada differs from *P. atrovirens* in its leaves being much longer acuminate (acumen longer than body), its polymorphous leaf cells, smooth or lightly papillate on upper surface; from *P. radicata* in being more rigid, leaf cells smaller and capsule more symmetric. Forms occur with the margins of the leaves less strongly recurved, costa thinner and shorter and median cells somewhat longer; it appears to take on these characters in its advance eastward and southward.

3. *Pseudoleskea pallida* sp. nov. [Pl. 6]

In dense appressed tufts, pale olive green above, rusty brown below. Primary stems defoliate, secondary prostrate-ascending, 2-4 cm. long, often matted together below, sparingly branched above; branches straight or curved at tips, but slightly diverging: paraphyllia few, small: stem leaves asymmetric, deeply concave, biplicate, lightly costate to near apex, straight or subsecund, .7-.9 mm. long, .4-.5 mm. wide; from a roundish ovate base gradually acute to abruptly short-acuminate, acumen somewhat blunt pointed and serrate or narrow and semi-twisted: cells of stem leaves

scarcely papillose, somewhat clear, primordial utricle usually distinct; basal cells rectangular-quadrate; alar quadrate to transversely oval; median rhombic-oval to hexagonal-oblong, .007-.009 mm. wide, about twice as long; apical oval-oblong. Dioicous: perichetial bracts erect, serrulate or entire, inner lightly costate: pedicels curved, 8 mm. long: capsule subsymmetric, oval-oblong, inclined, exothecial cells quadrate-oblong, irregular: urn 1.5 mm. long, .8 mm. wide: exostomial teeth yellowish confluent at base into a reddish basal band 3-4 joints wide: endostomial band pale yellow, $\frac{1}{4}$ the length of the teeth; segments as long as teeth, slightly open: cilia 2, rudimentary: annulus? operculum? spores rough, .013-.016 mm.

Type locality Colorado; type in coll. of Columbia University; collected by T. S. Brandegee.

Tenderfoot Creek, Belt Mts., Montana. R. S. Williams, Sept. 22, 1890. 4000 ft. altitude.

That there occurs in Colorado and Wyoming, and probably in the adjoining States, a *Pseudoleskea* distinct in its characters from the other species admits of but little doubt. It is, however, difficult to form a conception of its central type by reason of the scantiness and poor quality of the material at hand. It is just possible that the species in question is a derivative from *P. oligoclada*. Specimens collected by Earle & Tracy in southwestern Colorado, and by Elias Nelson in Wyoming, are intermediate between *P. pallida* and var. *filescens* and show a verging toward depauperate forms of *P. oligoclada*.

3a. *Pseudoleskea pallida filescens* var. nov.

Secondary stems filiform, simple, or with a few unequal branches: leaves ovate-lanceolate, gradually contracted to a narrowly acute or obtuse, serrate point, often serrulate above, .3-.4 mm. wide, .6-.8 mm. long: margins more or less recurved: costa shorter, disappearing above the middle: perichetial bracts erect, serrulate above, scarcely costate: capsule unknown.

Colorado; collected by T. S. Brandegee.

Differs from the type in being much more slender, leaves narrower and areolation somewhat longer and narrower, median cells oblong linear, and branch leaves longer acuminate and serrulate.

§ RADICOSELLA: Plants rather soft, lightly papillose or smooth, median cells usually more than twice as long as wide, basal cells quadrate to oblong-quadrate in several rows: leaves falcate-succund.

4. **Pseudoleskea denudata** Kindberg, Eur. & N. Am. Bry. 2 : 52. 1896. [Pl. 6]

Pseudoleskea sciuroides, var. *denudata* Kindb. Cat. Can. Plants 6 : 181. 1892.

? *Ptychodium oligocladum* Limpricht, Die Laubmoose, 2 : 801. 1895.

In loose spreading tufts, pale yellow-green above, dirty white below ; stems nearly destitute of branches, not radiculose, prostrate (zigzag-undulate), 6–10 cm. long, defoliate below ; stems and branches hooked at tips : paraphyllia multiform, mostly long and narrowly linear-lanceolate : lower stem leaves broken, shreddy ; upper loosely appressed and suberispate when dry, erect-spreading when moist, concave, more or less falcate-secund, lightly plicate, folds 2–4, margins broadly recurved to apex ; from a decurrent base ovate-lanceolate, acuminate, narrowly and obliquely pointed, entire or serrulate above, 1.9–2.2 mm. long, .7–.9 mm. wide : costa narrow, yellowish, subpercurrent : cells of stem leaves yellowish at base, smooth, clear, narrow : median cells sublinear vermicular, .005–.007 mm. wide, 4–6 times as long : basal oblong-rectangular : alar quadrate-oblong : apical linear : branch leaves much smaller, distinctly serrulate above. Dioicous : capsule unknown.

Type locality, British Columbia ; duplicate of type in Coll. of the Geol. Surv. of Can., no. 931 ; collected by Prof. John Macoun on rocks along the Asulcan Creek near a glacier of that name, Selkirk Mountains, alt. 6000 ft., Aug. 7, 1890 ; Can. Musc. no. 564.

4a. **Pseudoleskea denudata Holzingeri** var. nov.

In its gametophyte characters this differs from the type in its shorter and diffusely branched stems, in its somewhat smaller and more strongly falcate-secund leaves. Perichetial bracts small, thin, broadly ovate-oblong, abruptly and narrowly acuminate, serrulate above, tips spreading-recurved, inner subvaginant, costate : pedicels lightly curved, flattened and twisted above, 10–12 mm. long : capsules broadly oblong-oval, asymmetric, inclined, elongated and strongly contracted when dry and empty : urn 1.5–2 mm. long, 1 mm. wide : exothecial cells quadrate to quadrate-oblong, thick walled : exostomial teeth reddish brown, well developed and strongly lamellate, confluent into a purplish red band 4 joints wide : endostomial band yellowish papillose, $\frac{1}{3}$ the length of the teeth : segments as long as teeth, carinate, open :

cilia 1-3, papillose: annulus narrow: operculum short conic: spores rough, .016-.020 mm.: ripens in spring.

On the ground at high altitudes; collected by J. M. Holzinger and J. B. Blake near Lake McDonald, northwestern Mont., July 28, 1898, and by R. S. Williams in fruit near Columbia Falls, Mont., Oct. 10, 1895. A smaller form of what appears to be the same by Dr. Bell at Cape Chudleigh, Hudsons Strait; in Professor Macoun's collection. Bryoth. Mont. no. 343, R. S. Williams.

P. denudata, the largest of our species of *Pseudoleskea*, is easily recognized by its being nearly destitute of branches. It is probable, however, that it will be but rarely found in this form, but that transitional forms will be the more common. Var. *Holzingeri* is distinguished from *P. radicata* by its larger leaves, longer leaf cells and its freedom from radicles.

5. PSEUDOLESKEA RADICOSA (Mitt.) Lesq. & James. [Pl. 7]

Hypnum radicosum Mitten Jour. Linn. Soc. 8: 31. 1864.

Hypnum (*Pseudoleskea*) *radicosum* Lesq. & James, N. A. Mosses. 320. 1884.

Macounia sciuroides Kindb. Enum. Bryin. Exot. 1888.

Pseudoleskea sciuroides Kindb. Bull. Torr. Club, 17: 276. 1890.

Hypnum congestum Wils. Ms.

Hypnum congestum Hook. & Wils. in Drumm. N. A. Mosses, no. 225, in part.

In soft subsericeous tufts, yellow-green to dark green: stems 3-5 cm. long, somewhat densely radiculose, irregularly branched: branches usually recurved, simple: paraphyllia numerous, multi-form: stem leaves loosely appressed when dry, spreading when moist, secund, subdecurrent, biplicate, margins narrowly recurved to base of acumen: costa stout, usually toothed, disappearing in the acumen, from an ovate to oval-oblong base gradually or abruptly contracted to a narrow, oblique, serrulate or entire acumen, 1.2-1.6 mm. long, .35-.5 mm. wide: cells of stem leaves somewhat loose, smooth on lower surface, lightly papillose on upper, not rarely smooth on both: primordial utricle usually distinct: basal cells oblong-quadrate, in several rows; medial oval-oblong to linear-rhomboidal, .008-.010 mm. wide, 2-4 times as long: alar cells quadrate; apical linear; branch leaves falcate-secund, serrate. Dioicous: perichetial bracts erect, thin, whitish, finely acuminate,

inner subvaginant, lightly costate: pedicels 9–12 mm. long, curved: capsules oval to obovate-oblong, asymmetric, inclined to subpendant, elongated, contracted and arcuate when dry: urn 1.3–1.9 mm. long, .7–.9 mm. wide: exothecial cells thick-walled, oblong-quadrate: exostomial teeth reddish margined, confluent into a purplish red basal band 5 joints: endostomial band pale yellow, finely papillose, about $\frac{1}{4}$ the length of the teeth: segments oblong-lanceolate, carinate, somewhat open, as long but narrower than the teeth: cilia rudimentary: annulus narrow, indistinct: operculum conic, rarely short beaked: spores rough, .014–.018 mm.; ripe in spring and early summer.

Type locality, North America.

On rocks, stones, rotten wood, bases of trees and on the ground. From Labrador (Waghorne) and New Hampshire (Allen, Austin, C. E. Faxon) westward to British Columbia (Dawson, Macoun), probably failing in the central region. Idaho (Leiberg), Montana (Williams, Holzinger and Blake), Wyoming (Nelson), Washington (Piper, Röll).

EXSIC.: Ren. & Card. Musc. Am. Sept. 93 as *P. rigescens* Lindb.; Macoun, Can. Musc. 627 and 665 as *P. atrovirens* var.

5a. ***Pseudoleskea radicata compacta*** var. nov.

In intricate tufts or loose mats, dark green to blackish, branches often with yellow-green tips: stems 2–3 cm. long; branches short, turgid: stem leaves not rarely straight: median leaf cells oval-rhombic to oblong-hexagonal.

In general appearance quite distinct from the ordinary forms of the type but lacking specific characters. On rocks, Rocky Mts., B. C., Professor Macoun.

Mitten based *Hypnum radicosum* on Drumm. Musc. Am. 225, distributed as *Hypnum tenax*. Several sets of these were issued and no. 225 was not the same in all. Some packets contained simply *P. radicata*, others a mixture of this and *P. rigescens*. As the capsules of the latter were in better condition than those of the former, one was made to supplement the other. Wilson appears to have been the first to discover that there were two distinct species in some of Drummond's 225, one of which he named *Hypnum congestum*, the other *Leskea rigescens*. He failed, however, to publish descriptions of either, and had not Lindberg rescued the latter, both would have been dropped as *nomina nuda*.

In the Sullivant collection are two interesting specimens both of which were sent to Sullivant by Schimper. One of these is *Hypnum radicosum* from Mitten, the other *Leskea rigescens* from Wilson. These are to be regarded as duplicates of the types and are of value in that they serve to fix the meaning of these species.

6. PSEUDOLESKEA RIGESCENS (Wils.) Lindb. Act. Soc. Fenn. **10**: 277. 1872. [Pl. 7]

Leskea rigescens Wils. Ms. Drumm. Musc. Am. 225 in part.

Lescuraea rigescens Bryol. Eur. **5**: 1851.

Hypnum radicosum, var. *gracile* Lesq. & James, N. A. Mosses. 320. 1884.

Pseudoleskea stenophylla Ren. & Card. Bot. Centralbl. **44**: 421. 1890.

Lescuraea imperfecta C. M. & K. Cat. Can. Plants, **6**: 170. 1892.

Lescuraea stenophylla Kindb. Eur. & N. A. Bry. **26**: 1897.

In soft, somewhat silky intricate tufts or mats, pale yellow-green. Stems prostrate, 2-4 cm. long, radiculose, irregularly branched: branches unequal, curved, attenuate: paraphyllia small, linear-lanceolate: stem leaves subcrispate and loose when dry, erect-spreading when moist, straight or subsecund, lanceolate to ovate-lanceolate, gradually long and narrowly acuminate, entire or serrulate above, lightly biplicate, thinly costate, margins plain or revolute below, .8-1.2 mm. long, .25-.35 mm. wide: cells of stem leaves smooth or lightly papillose on upper surface, rarely on both: basal cells quadrate oblong in several rows: alar-quadrate, extending well up the margins; median sublinear-rhomboidal .007-.008 mm. wide, 2-4 times as long; apical oval to oval-oblong or sublinear; branch leaves narrower, serrulate above. Dioicous: perichetial bracts long lanceolate, narrowly acuminate, thin, erect, whitish, inner sub-sheathing, scarcely costate: pedicels erect or slightly curved above, 6-8 mm. long: capsule small, oval-oblong, usually erect, subsymmetric, lightly contracted when dry: urn 1 mm. long, 7 mm. wide: exothecial cells thick-walled, quadrate: exostomial teeth yellow-red, confluent at base into a dark red band 3 joints wide: endostomial band pale yellow, one sixth the length of the teeth or less; segments narrowly linear, as long as the teeth, concave, joints stout, 6-8: cilia none; annulus indistinct or none: spores nearly smooth, .014-.018 mm.; ripe in spring.

Type locality, North America.

On bases of trees or shrubs, more commonly on *Alnus*, and on rotten wood and rocks, in damp places at high altitudes. Montana (Williams), Idaho (Leiberg), Washington (Röll), British Columbia (Macoun).

EXSIC : Macoun, Can. Musc. 580.

P. rigescens is somewhat variable. The stem leaves range from being entire to serrate on the acumen, smooth to lightly papillose on both surfaces, costa thin, disappearing above the middle, to rather stout, sometimes toothed and subpercurrent. These differences are not rarely noted in a single specimen.

From *P. radicata* it differs in its narrower, and longer acuminate leaves (acumen longer than body), longer vaginule and perichetial bracts, and in its small, suberect capsule with linear segments. The gametophyte characters of depauperate forms of *P. radicata* are so near the stouter forms of *P. rigescens* that it is sometimes almost impossible to make a satisfactory determination without the sporophyte.

6a. ***Pseudoleskea rigescens* Howe** var. nov.

Intricate, appressed, pale green silky tufts : stems and branches strongly recurved : stem leaves secund to falcate-secund, serrate at apex, .7–.9 mm. long, .25–.35 mm. wide ; margins narrowly recurved : costa stout, disappearing in the acumen : areolation compact ; basal and alar cells numerous, quadrate, filling one third of the body of the leaf : capsules not seen.

Collected by Dr. M. A. Howe, Mt. Shasta, Calif., Aug. 5, 1894.

§ *LESCURAEA* Sch. : Plants soft, leaves usually smooth, median leaf cells long and narrow, extending downward to nearly the line of insertion, capsule symmetric, segments linear, cilia none.

7. ***Pseudoleskea substriata* sp. nov.** [Pl. 7]

In appressed subshining tufts, yellowish green to golden-brown : stems prostrate, radiculose, 2–4 cm. long, pinnately branched : branches suberect, simple, scarcely curved : paraphyllia few, multiform : stem leaves erect-spreading, straight, deeply biplicate, oval-oblong, gradually acute or acuminate (acumen shorter than body), .8–1 mm. long, .3–.4 mm. wide : margins strongly recurved to nearly apex, serrate above : costa toothed, subpercurrent : stem leaves smooth, clear ; basal oblong-linear in 2 or 3 rows : alar quadrate, rugose, thick-walled, filling the space between folds and margins, extending upwards and becoming oblong :

apical linear; median sublinear .006 mm. wide, 4-6 times as long. [Dioicous: perichetial bracts whitish, erect, inner sub-sheathing, finely acuminate, entire or serrulate above, lightly costate: pedicels 7-9 mm. long, straight or nearly so: capsules erect, symmetric, oval-oblong to subcylindric: urn 1.2 mm. long, .6 mm. wide: exothecial cells thick-walled, quadrate-oblong: exostomial teeth yellowish, linear-lanceolate, confluent at base into a reddish band 3 joints wide, scarcely lamellate: endostomial band about $\frac{1}{8}$ the length of the teeth; segments narrowly linear, somewhat shorter than the teeth: cilia none: annulus narrow, indistinct: operculum long conic: spores rough, .013-.016 mm.: from European specimens.]

Type locality, British Columbia; type in Coll. of Geol. Surv. of Canada; collected by Prof. John Macoun on rocks below Hector, Rocky Mts., Aug. 13, 1890. R. S. Williams, rocks on shores of Lake Lindeman, Northwest Territory, May 21, 1898. Sterile.

The basal cells which are oblong-linear in 2 to 3 rows, abruptly passing to the median, readily distinguished *Lescuraea* from the other two subgenera in which the basal cells are quadrate or oblong-quadrate in several rows passing somewhat gradually to the median.

Plants referable to this subgenus are evidently rare in North America. In Europe they are not uncommon, on the higher mountains, often in fruit. Limpricht* recognizes two species, *L. striata* (Schwaegr.) Br. & Sch. and *L. saxicola* (Br. & Sch.) Molendo, which represent the extremes of a series of intergrading forms. Between these are a number of intermediate forms some of which are sufficiently distinct to be recognized as species. *P. substriata* is one of these and differs from *L. striata* in being smaller and in having its smaller leaves shorter acuminate and the acumen more or less sharply serrate. In *L. striata* the leaves are usually entire, long and slenderly acuminate, 1.8 mm. long, .5 mm. wide.

EXCLUDED OR DOUBTFUL SPECIES

Pseudoleskea atricha Kindb. Eur. & N. A. Bry. 53. 1897.

Pseudoleskea atrovirens var. *atricha* Kindb. Cat. Can. Plants, 6: 180. 1892.

* Die Laubmoose, 2: 789. 1895.

"Leaves ovate-oblong, short acuminate, cells sublanceolate, conflated, irregularly sinuous; costa not excurrent. Capsule unknown, tufts brownish or olivaceous with green branch tips, loosely cohering, without rhizoids. Branches subjulaceous, irregularly divided; paraphyllia few."—Eur. & N. A. Bry. 53.

Type locality, Griffin Lake, B. C.

Duplicates of the type of this dubious species are in Prof. Macoun's collection, no. 385. As it has been apparently collected but once, and then in a poor condition, without fruit, it would be well perhaps to suspend judgment until more and better material is at hand.

PSEUDOLESKEA FALCICUSPIS C. M. & K. Cat. Can. Plants 6: 182.
1892

In Prof. Macoun's collection are a few specimens bearing this name, some of which are *P. atrovirens*, the others *P. oligoclada*. The description in Macoun's catalogue, "leaves very papillose" and "cells rotundate" evidently applies to *P. atrovirens*; that in Eur. & N. A. Bry. "leaves faintly papillose and cells oval-oblong" to *P. oligoclada*. As both of these species antedate *P. falcicuspis* it matters little of which it is a synonym so that its true standing be recognized.

Pseudoleskea atrovirens filamentosa Boulay Musc. de la France, 1: 162. 1884.

According to Barnes & Heald* this variety is found in Montana, Oregon and Washington. As I have seen no specimens of it from these localities I can neither confirm nor deny its occurrence there. From Boulay's description slender forms of *P. oligoclada* might be taken for it and the same is true of *P. denudata Holzingeri*. I am indebted to Mr. H. N. Dixon for a specimen collected and named by M. Boulay. It is a well-marked form of what passes as *P. atrovirens* with European bryologists, but it is entirely distinct from that species. The median cells of var. *filamentosa* closely resemble those of *P. substriata*, but the basal are oblong-quadrate in several rows and the capsule is arcuate.

* Analytic Keys to the Genera and Species of N. A. Mosses, 337. 1897.

Description of Plates

PLATE 6

Pseudosleskea atrovirens.—1. Upper and lower leaves. 2. Outer and inner perichetial leaves. 3. Paraphyllium. 4. Apex of leaf. 5. Median cell. 6. Alar cells. 7. Cross-section.

Pseudosleskea oligoclada.—8. Branch leaves. 9. Stem leaf. 10. Paraphyllium. 11. Apex of leaf. 12. Median cells. 13. Alar cells. 14. Cross-sections of leaf. 15. Capsule.

Pseudosleskea pallida.—16. Stem leaves. 17. Paraphyllium. 18. Apex of leaf. 19. Median cells. 20. Alar cells. 21. Back of apex of leaf, showing rough costa, and papillae on upper surface.

Pseudosleskea denudata.—22. Branch leaves. 23. Stem leaf. 24. Simple and divided paraphyllia. 25. Apex of leaf. 26. Median cells. 27. Alar cells.

PLATE 7

Pseudosleskea radicata.—1. Branch leaf. 2. Stem leaf. 3. Perichetial leaf. 4. Apex of leaf. 5. Median cells. 6. Alar cells. 7. Cross-section of leaf. 8. Back of costa near apex. 9. Paraphyllium.

Pseudosleskea rigescens.—10. Stem leaves. 11. Perichetial leaf. 12. Paraphyllium. 13. Apex of leaf. 14. Median cells. 15. Alar cells. 16. Cross-section.

Pseudosleskea substriata.—17. Branch leaf. 18. Stem leaves. 19. Paraphyllium. 20. Apex of leaf. 21. Median cells. 22. Basal half of leaf. 23. Cross-section. 24. Back of costa near the apex.

Pseudosleskea oligoclada.—25. Capsule with lid. 26. Capsules without lid. 27. Peristome.

Pseudosleskea denudata.—28. Horizontal and arcuate capsules. 29. Peristome.

Pseudosleskea radicata.—30. Two curved capsules, with and without lid. 31. Peristome with oblong-lanceolate segments.

Pseudosleskea rigescens.—32. Two straight capsules, with and without lid. 33. Peristome with linear segments.

Leaves magnified about 25 diameters; cells and sections magnified up to 260 diameters.